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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/088,306	03/18/2002	Hiromoto Ohno	Q60716	2926
23373	7590	05/26/2006	EXAMINER	
SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			WARTALOWICZ, PAUL A	
			ART UNIT	PAPER NUMBER
			1754	

DATE MAILED: 05/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.



<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/088,306	OHNO ET AL.	
	Examiner	Art Unit	
	Paul A. Wartalowicz	1754	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 16 March 2006.
- 2a) ☒ This action is **FINAL**.      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) 23-36 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 March 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |



## DETAILED ACTION

### *Response to Arguments*

Applicant's arguments filed on March 16, 2006 have been fully considered but they are not persuasive.

Applicant argues that  $\text{CHF}_3$  was added to the test waste stream to confirm that  $\text{NF}_3$  was selectively destroyed without converting  $\text{CHF}_3$  and that the feed of example 3 containing 3 weight %  $\text{CHF}_3$  is not an etching gas or a cleaning gas, but rather attempts to simulate a waste gas stream.

This argument is not persuasive for the following reason: Hsuing et al. teach a feedstock that is representative of a stream that has been used in the laboratory for semiconductor cleaning or etching (col. 4, lines 10-14) and  $\text{CHF}_3$  is most reactive FC used in electronics (suggesting use in a semiconductor feed stream, col. 5, lines 56-60). The motivation stems from the reasoned explanation that  $\text{CHF}_3$  and  $\text{SF}_6$  are used in the semiconductor industry and for similar purposes (col. 4, lines 12-14) such that it would be obvious to use them in similar amounts and that the stream in example 3 is a simulation of a stream used in a semiconductor application; and it would be obvious to one of ordinary skill in the art to determine through routine experimentation the amount of  $\text{SF}_6$  given the teachings of Hsuing et al.

Applicant argues that Hsuing et al. does not teach or describe a cleaning gas as a single unit operation.



This argument is not persuasive for the following reason: In response to applicant's argument that Hsuing et al. does not teach or describe a cleaning gas as a single unit operation, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

Applicant argues that column 4, lines 12-13 describes that other FC's, such as  $\text{CF}_4$ ,  $\text{C}_2\text{F}_6$  etc., are used in the semiconductor labs for similar purposes, and that this passage does not say that these other FC's are used in combination with  $\text{NF}_3$ , but rather teaches to the contrary.

This argument is not persuasive for the following reason: The passage column 4, lines 12-13 is not relied upon to teach that other FC's are used in combination with  $\text{NF}_3$ , evidence for the other FC's used in combination with  $\text{NF}_3$  is found in col. 3, lines 52-55 wherein Hsuing et al. describes a semiconductor exhaust stream comprising  $\text{NF}_3$  with other FC's.

Applicant argues that the feed of example 1 describes treatment of a feed containing 1 % weight  $\text{NF}_3$  and nitrogen and this has nothing to do with a cleaning gas, and also has nothing to do with an exhaust gas other than possibly suggesting that a typical exhaust gas might contain 1 % weight  $\text{NF}_3$ .



This argument is not persuasive for the following reason: Example 1 is not relied upon to teach the gas composition of Hsuing et al. Also, in response to applicant's argument that the feed of example 1 describes treatment of a feed containing 1 % weight  $\text{NF}_3$  and nitrogen and this has nothing to do with a cleaning gas, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

Applicant argues that there is no mention of  $\text{NF}_3$  and that example 3 was a test to determine whether the most reactive of FC's would be converted in the reactor and not a test of etching rate or any other unit operation in a semiconductor fabrication, and thus there is no motivation or reason to consider substituting  $\text{SF}_6$  for the  $\text{CHF}_3$  and was not interested in the less reactive  $\text{SF}_6$ .

This argument is not persuasive for the following reason: Hsuing et al. teach a feedstock that is representative of a stream that has been used in the laboratory for semiconductor cleaning or etching (col. 4, lines 10-14) and  $\text{CHF}_3$  is most reactive FC used in electronics (suggesting use in a semiconductor feed stream, col. 5, lines 56-60). The motivation stems from the reasoned explanation that  $\text{CHF}_3$  and  $\text{SF}_6$  are used in the semiconductor industry and for similar purposes (col. 4, lines 12-14) such that it would be obvious to use them in similar amounts and that the stream in example 3 is a simulation of a stream used in a semiconductor application; and it would be obvious to



one of ordinary skill in the art to determine through routine experimentation the amount of SF<sub>6</sub> given the teachings of Hsuing et al.

Applicant argues that there is nothing to optimize in Hsuing et al. Regardless of the amount of FC's in the waste stream, the object of Hsuing et al. is to selectively destroy the NF<sub>3</sub> without converting FC's. The exhaust gas can contain as much or as little FC's as is produced by the various unit operations in the semiconductor facility.

This argument is not persuasive for the following reason: The disclosure wherein FC's are used in the semiconductor labs for etching comprise FC's and an inert gas as being the major constituent (col. 4, lines 12-16). As stated, usually the consumption of FC's in the semiconductor processes is not complete and therefore necessitates treatment of the exhaust gas (col. 4, lines 15-18). This is the motivation to optimize the amount of inert gas in the exhaust stream such that treatment of the exhaust stream does not be extensive. With the bulk of the exhaust stream being an inert gas, it is reasoned that the exhaust stream is diluted as much as possible without diminishing the utility of the FC stream in the applicability to the semiconductor industry.

Applicant argues that Hsuing et al. fail to describe a cleaning gas, because it concerns a waste gas.

This argument is not persuasive for the following reason: In response to applicant's argument that Hsuing et al. fail to describe a cleaning gas, because it



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concerns a waste gas, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

Applicant argues that there is nothing in Hsuing et al. that would suggest the desirability of modifying waste gas collected in a semiconductor fabrication facility to arrive at the claimed cleaning gas.

This argument is not persuasive for the following reason: Hsuing et al. teach a feedstock that is representative of a stream that has been used in the laboratory for semiconductor cleaning or etching (col. 4, lines 10-14) and  $\text{CHF}_3$  is most reactive FC used in electronics (suggesting use in a semiconductor feed stream, col. 5, lines 56-60). The motivation stems from the reasoned explanation that  $\text{CHF}_3$  and  $\text{SF}_6$  are used in the semiconductor industry and for similar purposes (col. 4, lines 12-14) such that it would be obvious to use them in similar amounts and that the stream in example 3 is a simulation of a stream used in a semiconductor application; and it would be obvious to one of ordinary skill in the art to determine through routine experimentation the amount of  $\text{SF}_6$  given the teachings of Hsuing et al.

***Repeated Rejections***

***Claim Rejections - 35 USC § 103***



The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsuing et al. (U.S. 6106790).

Hsuing et al. teach a gas for cleaning (col. 4, lines 9-13) including  $\text{NF}_3$ , which may also have  $\text{SF}_6$  and/or  $\text{F}_2$  and also includes  $\text{N}_2$ ,  $\text{O}_2$ ,  $\text{CF}_4$ ,  $\text{C}_2\text{F}_6$   $\text{CHF}_3$  (col. 2, lines 61-66) with a 1%  $\text{NF}_3$  concentration (col. 5, lines 21-22). Hsuing et al. fail to teach containing  $\text{SF}_6$  in an amount of about 0.4-4.5 vol% and the inert gas is from 0.01 to 500 in terms of the volume ratio assuming  $\text{SF}_6$  is 1.

Hsuing et al., however, teach the grouping of  $\text{CHF}_3$  and  $\text{SF}_6$  as fluorocarbons that can be used for similar purposes in the semiconductor lab (col. 4, lines 12-14). Hsuing et al. goes on to teach a feed comprising 3 wt%  $\text{CHF}_3$  (col. 5, lines 55-56).



Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to have provided a 3 wt% SF<sub>6</sub> as both are used for similar purposes in semiconductor labs (col. 4, lines 12-14) as taught by Hsuing et al. It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize FC's such as CHF<sub>3</sub> and SF<sub>6</sub> since it has been held that discovering an optimum value or a result effective variable involved only routine skill in the art. In re Boesch, 617 F.2<sup>nd</sup> 272, 205 USPQ 215 (CCPA 1980). The artisan would have been motivated to optimize FC's such as CHF<sub>3</sub> and SF<sub>6</sub> by the reasoned explanation that if too much FC's are in the feed, the exhaust stream will need to be treated before venting into the atmosphere (col. 4, lines 15-19).

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.




Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul A. Wartalowicz whose telephone number is (571) 272-5957. The examiner can normally be reached on 8:30-6 M-Th and 8:30-5 on Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Paul Wartalowicz  
May 17, 2006



**COLLEEN P. COOKE**  
**PRIMARY EXAMINER**